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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/578,564	05/25/2000	Victor Firoiu	2204/A05	6201

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EXAMINER
RYMAN, DANIEL J

ART UNIT	PAPER NUMBER
2665	

DATE MAILED: 09/23/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/578,564	FIROIU ET AL.	
	Examiner	Art Unit	
	Daniel J. Ryman	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☒ Claim(s) *4,11, and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 May 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *8*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 2/22/02 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. Specifically, no copy of the Woo-June et al reference was provided.

Drawings

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: ref. 1430 (see page 15 and Fig. 14). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the shaded region (see Fig. 9) as described in the specification (see page 11, line 5). Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required

in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The abstract of the disclosure is objected to because it exceeds 150 words in length. In addition, on line 5 of the abstract, the phrase "is calculating" should be "is calculated". Correction is required. See MPEP § 608.01(b).

6. The disclosure is objected to because of the following informalities: on page 2, line 20, the phrase "is calculating" should be "is calculated". On page 8, line 23 "(where is the average..." should be "(where q is the average...". On page 10, line 2 "Tmin however the" should be "Tmax; however, the". On page 10, line 2 "Tmax the connection" should be "Tmax for the connection". On page 15, line 10 "STEP 1420" should be "step 1420" to match the other labels in the specification.

Appropriate correction is required.

Claim Objections

7. Claim 4 is objected to because of the following informalities: each phrase should be separated by a semicolon, i.e. "policy determining" should be "policy; determining". Appropriate correction is required.

8. Claim 11 is objected to because of the following informalities: "wherein if the data transmission is not acknowledged by the sender reduces the transmission rate" should be "wherein if the data transmission is not acknowledged the sender reduces the transmission rate". Appropriate correction is required.

9. Claim 21 is objected to because of the following informalities: claim 21 is in the form of a dependent claim but does not disclose the claim on which it depends. For the purposes of prior art rejections, claim 21 will be interpreted as depending on claim 20. Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 recites the limitation "the function" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 9 depends upon claim 7, which contains two functions, namely a queue law function and a control function. Since the limitation of claim 9 does not specify which function should be linear, it is vague and indefinite. For the purposes of prior art rejections, Examiner will interpret claim 9 to read "the control function".

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claim 22 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 22, which discloses that the queue policy is a drop conservative policy, depends upon claim 21, which discloses that the

queue policy is a delay conservative policy. Since the queue policy cannot be both drop conservative and delay conservative simultaneously, claim 22 is not enabling. For the purposes of prior art rejections, Examiner will interpret claim 22 as depending on claim 20 rather than claim 21.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-3, 7-9, and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Floyd et al (Floyd S et al. "Random Early Detection Gateways for Congestion Avoidance". IEEE/ACM Transactions on Networking, IEEE Inc. New York, US. vol. 1, no. 4, 1 August 1993. pages 397-413).

16. Regarding claims 1 and 12, Floyd discloses a method and apparatus for determining a drop probability (pages 400-401, section 4), the method comprising steps of and the apparatus comprising means for: systematically calculating a weight for determining a weighted moving average of a queue in a node (pages 400-401, section 4 and pages 403-404, section 6); calculating the weighted moving average (pages 400-401, section 4); determining an average queue size based upon the weighted moving average (pages 400-401, section 4); and evaluating a control function using the average queue size to determine the drop probability (page 400-401, section 4).

17. Regarding claims 2 and 13, referring to claims 1 and 12, Floyd discloses that systematically calculating a weight comprises: determining a sampling period for measuring the queue size (pages 400-401, section 4; pages 403-404, section 6; pages 405-407, section 8); determining a time period for which samples significantly contribute to the average queue size (pages 400-401, section 4; pages 403-404, section 6; pages 405-407, section 8); and determining the weight based upon the sampling period and the time period (pages 400-401, section 4; pages 403-404, section 6; pages 405-407, section 8).

18. Regarding claims 3 and 14, referring to claims 1 and 12, Floyd discloses that determining a control function comprises: determining a queue function based upon predetermined system parameters (average queue size algorithm) (pages 400-401, section 4); and determining the control function based upon the queue function (packet marking algorithm) (pages 400-401, section 4 and pages 404-405, section 7).

19. Regarding claims 7 and 15, Floyd discloses a method and apparatus for reducing oscillations in queue size in a link using congestion control that operates in a TCP environment (pages 400-401, section 4 and pages 405-407, section 8, esp. page 406), the method comprising the steps of and the apparatus comprising means for: determining a queue law function (average queue size algorithm) defining the average size for a link based at least upon the variable of drop probability (pages 400-401, section 4 and pages 403-404, section 6); defining a control function (packet marking algorithm) which determines the drop probability based upon the average queue size (pages 400-401, section 4 and pages 404-405, section 7) wherein a bounding point for the control function defining a maximum value of drop probability and a maximum value of the average queue size is greater than an equivalent point on the queue law function for either the

maximum value of the average queue size or the maximum value of the average drop probability (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8, esp. page 406) where "bounding point" is a broad term which is interpreted to mean a point which lies outside the maximum point of the equations, hence "bounding," where the maximum range of the equations is the maximum value of the average queue size or the maximum value of the drop probability; and dropping packets from the queue based upon a packet drop rate defined at a point of intersection for the control function and the queue law function (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7).

20. Regarding claim 8, referring to claim 7, Floyd discloses that in the step of defining the control function, the control function is further defined as a function having no discontinuities (pages 400-401, section 4 and pages 404-405, section 7).

21. Regarding claim 9, referring to claim 7, Floyd discloses that the control function is piecewise linear (pages 400-401, section 4 and pages 404-405, section 7).

22. Regarding claim 16, Floyd discloses an apparatus for reducing oscillations in queue size in a link using congestion control that operates in a TCP environment (pages 400-401, section 4 and pages 405-407, section 8, esp. page 406), the apparatus comprising: a configuration module for systematically determining control function configuration parameters based upon traffic characteristics (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8); a control function module receiving the control function configuration parameters which define a control function and receiving an estimated queue size (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8), the estimated queue size used in conjunction with the defined control function to

determine a drop probability (pages 400-401, section 4 and pages 404-405, section 7); and a processor for dropping packets from the queue based upon a packet drop rate (pages 400-401, section 4).

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. Claims 4-6, 10, and 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Floyd et al (Floyd S et al. "Random Early Detection Gateways for Congestion Avoidance". IEEE/ACM Transactions on Networking, IEEE Inc. New York, US. vol. 1, no. 4, 1 August 1993. pages 397-413).

25. Regarding claims 4 and 20, referring to claims 3 and 19, Floyd suggests that determining the control function further comprises: selecting a queue policy (pages 400-401, section 4); determining a threshold value based upon the selected queue policy (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7); determining a maximum point based upon the threshold value, wherein the maximum point is outside of the queue function (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8, esp. page 406, subsection 3); selecting the control function such that when the control function is evaluated a point passes through the maximum point (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8, esp. page 406). Floyd does not expressly disclose selecting a queue policy; however, Floyd suggests this by

disclosing that "the average queue size which makes the desired tradeoffs (such as the tradeoff between maximizing throughput and minimizing delay) depends on network characteristics, and is left as a question for further research" (pages 400-401, section 4, esp. page 401, lower half of col. 1), where the queuing policy would be chosen based upon the network characteristics. It would have been obvious to one of ordinary skill in the art at the time of the invention to select a queuing policy in order to make desired tradeoffs between maximizing throughput and minimizing delay depending on network characteristics. Further, Floyd does not expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well-known way to implement methods since computer programs are very flexible.

26. Regarding claims 5 and 21, referring to claims 4 and 20, Floyd suggests that the queue policy is a delay conservative policy and wherein determining a threshold value comprises: determining a maximum value for the average queue size (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8, esp. page 406). Floyd does not expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well-known way to implement methods since computer programs are very flexible.

27. Regarding claims 6 and 22, referring to claims 4 and 20, Floyd discloses that the queue policy is a drop conservative policy and wherein determining a threshold value comprises: determining a maximum value for the drop probability (pages 400-401, section 4; pages 403-404, section 6; pages 404-405, section 7; and pages 405-407, section 8, esp. page 406). Floyd does not expressly disclose that the method is implemented in a computer program; however,

Examiner takes official notice that computer programs are a well-known way to implement methods since computer programs are very flexible.

28. Regarding claims 10 and 26, Floyd discloses a method for increasing utilization of a link capable of receiving a number of flows into a buffer, the link residing in a TCP network, the link having a congestion control module which drops packets to avoid buffer overflow (pages 400-401, section 4 and pages 401-403, section 5), the method comprising: determining a quantity representative of a capacity for the link (maximum threshold) (pages 400-401, section 4 and pages 404-405, section 7); calculating a quantity representative of the throughput for the link (average queue size) (pages 400-401, section 4 and pages 404-405, section 7); determining the utilization based on the capacity of the link, the throughput of the link, the numbers of flows and a packet drop probability (pages 400-401, section 4; pages 401-403, section 5; pages 403-404, section 6; and pages 404-405, section 7). Floyd does not expressly disclose adjusting the packet drop probability to increase the utilization of the link; however, Floyd does suggest this. Floyd teaches that the probability that a packet will be dropped will affect the number of packets dropped (pages 400-401, section 4; pages 401-403, section 5; pages 403-404, section 6; and pages 404-405, section 7). It is implicit that the number of packets dropped affects link utilization. Therefore, adjusting the packet drop probability will affect the utilization of the link. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the packet drop probability in order to increase the utilization of the link such that link utilization is maximized. Further, Floyd does not expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well-known way to implement methods since computer programs are very flexible.

29. Regarding claim 17, incorporating arguments from claim 1, Floyd does not further expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

30. Regarding claim 18, referring to claim 17, incorporating arguments from claim 2, Floyd does not further expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

31. Regarding claim 19, referring to claim 17, incorporating arguments from claim 3, Floyd does not further expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

32. Regarding claim 23, incorporating arguments from claim 7, Floyd does not further expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

33. Regarding claim 24, regarding claim 23, incorporating arguments from claim 8, Floyd does not further expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

34. Regarding claim 25, regarding claim 23, incorporating arguments from claim 9, Floyd does not further expressly disclose that the method is implemented in a computer program;

however, Examiner takes official notice that computer programs are a well known way to implement methods since computer programs are very flexible.

35. Claims 11 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Floyd et al (Floyd S et al. "Random Early Detection Gateways for Congestion Avoidance". IEEE/ACM Transactions on Networking, IEEE Inc. New York, US. vol. 1, no. 4, 1 August 1993. pages 397-413) in view of Silberschatz et al (USPN 6,556,578).

36. Regarding claims 11 and 27, Floyd discloses a method for congestion control in an apparatus having a queue which resides in a network wherein each data transmission from a sender to a receiver is sent at a transmission rate and the data transmission is acknowledged by the receiver (TCP) (pages 400-401, section 4), wherein if the data transmission is not acknowledged the sender reduces the transmission rate (TCP) (pages 400-401, section 4), the method comprising: ascertaining a network function which represents an average queue size of the queue based upon an apparatus drop rate (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7); determining a control function for the apparatus which produces an average queue size based upon a given apparatus drop rate (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7); calculating an equilibrium point based upon the intersection of the network function and control function (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7); and setting the drop rate of the apparatus to the equilibrium point (pages 400-401, section 4; pages 403-404, section 6; and pages 404-405, section 7). Floyd does not expressly disclose that the method is implemented in a computer program; however, Examiner takes official notice that computer programs are a well-known way to implement methods since computer programs are very flexible. Further, Floyd

does not expressly disclose that the apparatus is a server. Silberschatz teaches, in a system for dropping packets in a buffer system, that it is well known to use random early detection on a server in order to apply the benefits of random early detection to a server (col. 1, lines 23-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to have the apparatus be a server in order to apply the benefits of random early detection to a server.

Conclusion

37. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Des Jardins et al (USPN 5,936,939) see entire document which pertains to early packet discard. Skirmont (USPN 6,252,848) see entire document which pertains to adjusting the drop probability of a packet. Ott (USPN 6,434,116) see entire document which pertains to random early detection using connection sampling. Ott et al (USPN 6,560,198) see entire document which pertains to random early detection using packet sampling. Benmohamed et al (USPN 6,240,463) see col. 24, lines 36-45 which pertain to Floyd et al document.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Ryman whose telephone number is (703)305-6970. The examiner can normally be reached on Mon.-Fri. 7:00-5:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (703)308-6602. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

Daniel J. Ryman

Examiner
Art Unit 2665

DJR

Daniel J. Ryman

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